

We claim:

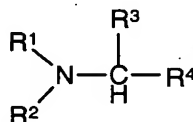
1. A process for preparing an amine by reacting a primary or secondary alcohol, aldehyde or ketone with hydrogen and a nitrogen compound selected from the group consisting of ammonia and primary and secondary amines in the presence of a catalyst whose preparation has involved precipitation of catalytically active components onto monoclinic, tetragonal or cubic zirconium dioxide.
2. A process as claimed in the preceding claims, wherein the catalytically active components precipitated are salts of a metal selected from transition groups VIII and IB of the Periodic Table.
3. A process as claimed in the preceding claim, wherein the metal salts are basic salts which are sparingly soluble or insoluble in water.
4. A process as claimed in either of the two preceding claims, wherein the salts are oxides, hydrated oxides, hydroxides, carbonates and/or hydrogencarbonates.
5. A process as claimed in any of claims 2 to 4, wherein the metal is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Pt and Cu.
6. A process as claimed in any of claims 2 to 4, wherein the metal is selected from the group consisting of Cu, Ni and Co.
7. A process as claimed in any of the preceding claims, wherein the catalytically active composition of the catalyst before treatment with hydrogen comprises from 20 to 85% by weight of oxygen-containing compounds of zirconium, calculated as  $ZrO_2$ , from 1 to 30% by weight of oxygen-containing compounds of copper, calculated as CuO, and from 14 to 70% by weight of oxygen-containing compounds of nickel, calculated as NiO.
8. A process as claimed in any of the preceding claims, wherein the catalytically active composition of the catalyst before treatment with hydrogen comprises from 20 to 65% by weight of oxygen-containing compounds of zirconium, calculated as  $ZrO_2$ , from 1 to 30% by weight of oxygen-containing compounds of copper, calculated as CuO, from 15 to 50% by weight of oxygen-containing compounds of nickel, calculated as NiO, and from 15 to 50% by weight of oxygen-containing compounds of cobalt, calculated as CoO.
9. A process as claimed in any of claims 5 to 8, wherein the molar ratio of nickel to copper is greater than 1.

10. A process as claimed in any of the preceding claims, wherein the monoclinic, tetragonal or cubic zirconium dioxide contains one or more oxides of metals of transition groups IIIB or main group IIA of the Periodic Table.

5 11. A process as claimed in any of the preceding claims, wherein the reaction is carried out at from 80 to 300°C.

12. A process as claimed in any of the preceding claims, wherein the reaction is carried out in the liquid phase at pressures of from 5 to 30 MPa or in the gas phase at pressures of  
10 from 0.1 to 40 MPa.

13. A process as claimed in any of the preceding claims for preparing an amine of the formula  
I



(I),

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$\text{R}^1, \text{R}^2$

are each hydrogen (H), alkyl such as  $\text{C}_{1-20}$ -alkyl, cycloalkyl such as  $\text{C}_{3-12}$ -cycloalkyl, alkoxyalkyl such as  $\text{C}_{2-30}$ -alkoxyalkyl, dialkylaminoalkyl such as  $\text{C}_{3-30}$ -dialkylaminoalkyl, aryl, aralkyl such as  $\text{C}_{7-20}$ -aralkyl or alkylaryl such as  $\text{C}_{7-20}$ -alkylaryl, or together form  $-(\text{CH}_2)_j\text{-X-(CH}_2)_k$ ,

$\text{R}^3, \text{R}^4$

are each hydrogen (H), alkyl such as  $\text{C}_{1-200}$ -alkyl, cycloalkyl such as  $\text{C}_{3-12}$ -cycloalkyl, hydroxyalkyl such as  $\text{C}_{1-20}$ -hydroxyalkyl, aminoalkyl such as  $\text{C}_{1-20}$ -aminoalkyl, hydroxyalkylaminoalkyl such as  $\text{C}_{2-20}$ -hydroxyalkylaminoalkyl, alkoxyalkyl such as  $\text{C}_{2-30}$ -alkoxyalkyl, dialkylaminoalkyl such as  $\text{C}_{3-30}$ -dialkylaminoalkyl, alkylaminoalkyl such as  $\text{C}_{2-30}$ -alkylaminoalkyl,  $\text{R}^5\text{-(OCR}^6\text{R}^7\text{CR}^8\text{R}^9)_n\text{-(OCR}^6\text{R}^7)$ , aryl, heteroaryl, aralkyl such as  $\text{C}_{7-20}$ -aralkyl, heteroarylalkyl such as  $\text{C}_{4-20}$ -heteroarylalkyl, alkylaryl such as  $\text{C}_{7-20}$ -alkylaryl, alkylheteroaryl such as  $\text{C}_{4-20}$ -alkylheteroaryl or  $\text{Y-(CH}_2)_m\text{-NR}^5\text{-(CH}_2)_q$ , or together form  $-(\text{CH}_2)_l\text{-X-(CH}_2)_m$ , or

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$R^2$  and  $R^4$  together form  $-(CH_2)_l-X-(CH_2)_m-$ ,

$R^5$ ,  $R^{10}$  are each hydrogen (H), alkyl such as  $C_{1-4}$ -alkyl or alkylphenyl such as  $C_{7-40}$ -alkylphenyl,

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$R^6$ ,  $R^7$ ,  $R^8$ ,  $R^9$  are each hydrogen (H), methyl or ethyl,

X is  $CH_2$ ,  $CHR^5$ , oxygen (O), sulfur (S) or  $NR^5$ ,

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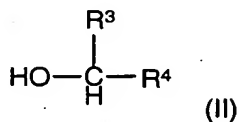
Y is  $N(R^{10})_2$ , hydroxy,  $C_{2-20}$ -alkylaminoalkyl or  $C_{3-20}$ -dialkylaminoalkyl,

n is an integer from 1 to 30 and

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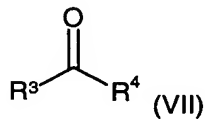
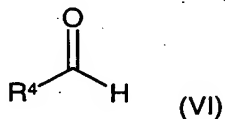
j, k, l, m, q are each an integer from 1 to 4,

by reacting a primary or secondary alcohol of the formula II



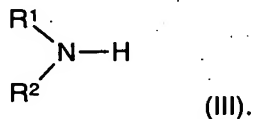
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or aldehyde or ketone of the formula VI or VII



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with a nitrogen compound of the formula III



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14. The use of a catalyst as claimed in any of claims 1 to 10 for preparing an amine by reacting a primary or secondary alcohol, aldehyde or ketone with hydrogen and a nitrogen compound selected from the group consisting of ammonia and primary and secondary amines.